

14. ETHNOBOTANICAL STUDY AND *EXSITU* CONSERVATION OF *ALPINIA GALANGA* WILLD. — A PROMISING MEDICINAL PLANT

Ethnobotany deals with studies among tribal and indigenous peoples to record their knowledge of plant wealth, and to find new resources of herbal drugs, edible and other useful plants. It also includes the attitudes and impact of human beings on plants in their vicinity. For centuries, indigenous people have managed their ecosystems for sustainable as well as for medico-pharmaceutical purposes. Such studies necessitate an understanding of the strategies employed to grow and harvest plants, and of the distribution of medicinal taxa along the land use types in and around a community.

According to the World Health Organization, an estimated 3.5 billion people in the developing world depend on plants for primary healthcare (Balick and Cox 1996); 85% of the traditional medicines in primary healthcare are derived from plants (Balick *et al.* 2000) and nearly 75% of the drugs mentioned in various pharmacopoeia are growing in India. Many people rely on medicinal plants because of their effectiveness, a lack of modern medical alternatives and traditional cultural preference. Ethnobotanical studies acquired priority because knowledge of native populations and their environment was threatened, while ethno-medical uses are documented for only *c.* 28% of plants on earth (Akerle 1991, Rossato *et al.* 1999).

India has an ancient, rich and diverse living tradition in the use of medicinal plants. Northeast India possesses great biological and cultural diversity, and the selection and domestication of plants for use in herbal medicine is ongoing.

Alpinia galanga, commonly known as Greater Galanga (English), Kulanjan (Hindi, Sanskrit), or Kanghu (Manipuri), grows wild in the Manipur Hills. It is a little known, rare, herbaceous perennial of the family Zingiberaceae

and is a native of Indonesia, Malaysia and India, mainly in the Eastern Himalaya and parts of southwest India. The rhizomes contain an oil, also called galanga oil, which has great medicinal value. The seeds are also used in medicine.

Conservation of this plant would benefit both the ecological integrity and cultural heritage of the region, and may provide a useful model for other sites. The objectives of the present study were: (i) to quantify and document the use of *A. galanga* in traditional medicine, and (ii) to develop sustainable management practices for its conservation in the field.

Alpinia galanga Willd. germplasm was collected from various places in Northeast India. Data and herbarium specimens were also collected. Surveys were made in 1999-2001 and open-ended interviews conducted with practitioners (herbalists, midwives, elders), and local people concerning plant use. Information was obtained from farmers, community members and curio sellers. We observed the use of plant parts in several tribal villages, and displays at roadside stalls.

A standard exploration schedule was designed with the help of language translators who assisted during the trip. Collections of germplasm were made with the help of local tribals and others, and the material was identified and confirmed with help from the Botanical Survey of India.

RESULTS

Field surveys for *Alpinia galanga* in 1999-2000 revealed that this plant grows wild only around Imphal, Mao and Maran areas, Ukrul and adjoining areas, and around Laithang in Manipur. It was also found growing in tribal kitchen gardens. Field trips during 2000-2001 were, therefore, confined to these regions.

Ethnographic background

Manipur is the easternmost state in the northeastern hill region of India at 51 m to 2,500 m above msl. Almost one-tenth of the area is covered by valleys, and the rest, hills. This temperate to subalpine area is inhabited mainly by Kuki, Tangkhul, Rongmai, Naga, Paite, Marh, Mao, Maran and Thangal tribals. Often, within small contiguous areas, there live many tribal communities, which differ markedly in socioeconomic and cultural values, isolated by language, cultural barriers and poor communication due to the difficult hilly terrain. The remote tribal areas have practically no organised medical facility. The high cost of antibiotics, pharmaceuticals and specialised healthcare enforces local dependence on traditional medicine.

The only difficulty in this work was that the tribals do not disclose easily the secret of the plants they use for medicinal and other purposes. They believe that the curative properties of the plant would be lost if they do so. They disclose these secrets only to their kith and kin, and that too, when they are near death. Much patience was required to win the confidence of the people to collect data.

Botanical description

Root: Perennial, tuberous, slightly aromatic, deep orange-brown, pungent, bitter. Rhizomes: Slightly aromatic like ginger, reddish brown, internally reddish white. Stem: Pseudostem, elongated, 200-250 cm. Leaves: 30-40 cm x 10-15 cm, green, glossy on both sides, oblong, short-stalked, lanceolate, smooth. Inflorescence: Panicles copiously compound, branched, densely flowered, 15-30 cm long, rachis densely pubescent, and branches short. Flowers: About 3 cm long, greenish white, in compound dense bunches, pedicles 0.8-1.25 cm, bracts small, ovate, flowers small. Calyx: Greenish white, 1.25 cm, oblique at the throat, smooth, one-toothed. Corolla: Segments 0.8-1.25 cm, lip

distinctly clawed, 5-6 cm, basal glands ascending, white striated with red, linear subulated, exterior limb of corolla with 3 subequal recurved divisions, interior one unguiculate, oval, deeply bilobed. Stamens: Arcuate, shorter than tip. Ovules: 1-2 in a cell. Fruits: Orange red, 1.25 cm long, obovate, smooth. Seed: Globose or angled, much compressed, deep chestnut coloured, a little wrinkled, arillate except at the apex.

Phenology: F. April to June; Fr. November to December.

Propagation: Wild populations of *Alpinia galanga* Willd. reproduce vegetatively through rhizomes.

Distribution: Native to Indonesia, Malaysia and India, mainly in the eastern Himalaya, Western Ghats and southwest India.

Utilisation by Manipuri tribals

The faintly aromatic, pungent and somewhat bitter tubers are used as a substitute for ginger. *A. galanga* rhizomes are ground, and used in their normal diet. The plant is believed to improve the appetite, and the taste of food. It stimulates blood circulation and has a good taste. It is used in bronchitis, dyspepsia and heart disease. The juice of the rhizomes is used as a disinfectant and freshener. A decoction is taken after childbirth.

It is also variously used as stomachic, aphrodisiac, tonic, diuretic, expectorant, and for rheumatic pain, sore throat, sour eructation, stuttering, chest pain, diabetes, and to alleviate tubercular glands, and diseases of the kidney. Galanga oil, extracted from the rhizomes of the plant, is believed to have antitumor, anti-ulcer, anticaliculi, antibiotic and fungicidal properties.

Seeds are considered calefacient alterative, stomachic, sternutatory, beneficial in colic, diarrhoea and vomiting. Fungal infections on the skin are treated with seed paste, as it contains the fungicidal, diterpene. It is also believed to have cytotoxic properties.

Ex situ conservation and management

Rhizomes of wild plant populations were collected and brought to the experimental farm of NBPGR Regional Station, Barapani. They were divided into small pieces containing 2-3 emerging buds, weighing 60-80 g each. While still fresh, they were planted at a depth of about 5 cm in raised nursery beds, 2.7 m x 2.1 m. Row-to-row distance of the raised beds was 45 cm and plant-to-plant distance within a row was 30 cm. Eighty-four raised beds were made, each containing 42 sample rhizomes, i.e. a total of 3,528 plants were grown in the experimental nursery. The following observations were made on one year old plants:

- i) Germination percentage of rhizomes was almost 100%.
- ii) Average number of culms per plant was 22.
- iii) Average height of the one year old plant was 115 cm.
- iv) Average fresh weight of the rhizome per one year old plant was 450 g.
- v) Rate of multiplication per plant was 10 per year, i.e. rhizomes from a year old plant yielded 10 pieces for replanting.

Economic potential

Based on the average weight of rhizomes from one year old wild plants in kitchen gardens, and those cultivated, the average yield of the rhizomes was calculated to be around 25 tonnes

per hectare. However, extrapolating from one year old plants in the experimental plots and the average weight of the rhizomes, it was estimated to be a potential yield of 35 tonnes per hectare, which may increase on optimising a cultivation package. Dried rhizomes of *A. galanga* were being sold in the local market of Manipur, and also in Delhi. The market price was Rs. 22-25 per kg.

Alpinia galanga Willd. is an easily cultivable potential medicinal plant. If cultivated commercially, it can make a good cash crop. It may be pointed out that development of agrotechniques for the commercial cultivation of this plant will benefit the farming community and other tribals in northeast India and provide them with a source of income.

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